Listing of Claims:

1. (Currently Amended) An optical DNA sensor comprising:

a solid imaging device which is configured to have a plurality of types of DNA probes each including a different nucleotide sequence arrayed and fixed on a surface of the solid imaging device;

a plurality of photoelectric elements provided in the solid imaging device;

an exciting light absorbing layer provided between the DNA probes and the photoelectric elements to selectively absorb exciting light and to selectively transmit fluorescent light which is emitted from a fluorescent substance excited by the exciting light; and

a conductive layer which discharges charges caused by electron-hole pairs generated by the absorbed exciting light in the exciting light absorbing layer.

Claims 2 and 3 (Canceled).

4. (Previously Presented) The optical DNA sensor as claimed in claim 1, wherein each of the photoelectric elements comprises a field effect transistor which has a semiconductor layer that generates electric charges by receiving light.

5. (Currently Amended) An optical DNA sensor comprising:

a solid imaging device,

an exciting light absorbing layer which selectively absorbs exciting light and selectively transmits fluorescent light which is emitted from a fluorescent substance excited by the exciting light, and which is formed on a surface of the solid imaging device, and which is configured to have a plurality of types of DNA probes each including a different nucleotide sequence aligned and fixed on the exciting light absorbing layer,

a plurality of photoelectric elements provided in the solid imaging device, and

a conductive layer which discharges charges caused by electron-hole pairs generated by the absorbed exciting light in the exciting light absorbing layer.

Claims 6-7 (Canceled).

8. (Currently Amended) An optical DNA sensor comprising:

a solid imaging device having a transparent substrate;

a plurality of photoelectric elements which are arranged apart from each other on a surface of the transparent substrate and each of which includes a bottom gate electrode having a shading property, a semiconductor layer having a light

sensitivity, and a light-transmissive top gate electrode, wherein the bottom gate electrode, the semiconductor layer and the light-transmissive top gate electrode are layered in order on the transparent substrate;

means for applying negative voltage to each of the light-transmissive top gate ~~electrode~~ electrodes in a charge storage period;

a light-transmissive protective layer which coats the plurality of photoelectric elements, and which is configured to have a plurality of types of DNA probes each including a different nucleotide sequence aligned and fixed thereon;

a transparent conductive layer which is provided in the solid imaging device between the DNA probes and the plurality of photoelectric elements, [[;]] and to which a positive voltage is applied to attract a nucleotide strand.

~~means for applying one of a positive voltage and a ground potential to the transparent conductive layer~~.

Claim 9 (Canceled).

10. (Currently Amended) A DNA reading apparatus comprising:

(i) an optical DNA sensor which comprises:

a solid imaging device having a transparent substrate;

a plurality of photoelectric elements which are arranged apart from each other on a surface of the transparent substrate and each of which includes a bottom gate electrode having a shading property, a semiconductor layer having a light sensitivity, and a light-transmissive top gate electrode, wherein the bottom gate electrode, the semiconductor layer and the light-transmissive top gate electrode are layered in order on the transparent substrate;

means for applying negative voltage to each of the light-transmissive top gate ~~electrode~~ electrodes in a charge storage period;

a light-transmissive protective layer which coats the plurality of photoelectric elements, and which is configured to have a plurality of types of DNA probes each including a different nucleotide sequence aligned and fixed thereon; and

a transparent conductive layer which is provided in the solid imaging device between the DNA probes and the plurality of photoelectric elements, and to which a positive voltage is applied to attract a nucleotide strand; and

~~means for applying one of a positive voltage and a ground potential to the transparent conductive layer; and~~

(ii) a light irradiation member which irradiates phosphor exciting light toward a rear surface of the transparent substrate of the solid imaging device.

11. (Original) A DNA reading apparatus as claimed in claim 10, wherein the light irradiation member is disposed below the optical DNA sensor.

12. (Previously Presented) A DNA reading apparatus as claimed in claim 11, wherein the light irradiation member irradiates the phosphor exciting light to the DNA probes through the solid imaging device.

13. (Previously Presented) A DNA reading apparatus as claimed in claim 11, wherein the light irradiation member irradiates both the plurality of types of DNA probes and the solid imaging device, and the phosphor exciting light irradiated by the light irradiation member has a wavelength in a range which excites a fluorescent substance that labels a sample DNA bondable to an appropriate one of the DNA probes but does not sufficiently excite the solid imaging device.

Claims 14-16 (Canceled).

17. (Previously Presented) A DNA reading apparatus as claimed in claim 12, wherein the light irradiation member irradiates both the plurality of types of DNA probes and the solid imaging device, and the phosphor exciting light irradiated

by the light irradiation member has a wavelength in a range which excites a fluorescent substance that labels a sample DNA bondable to an appropriate one of the DNA probes but does not sufficiently excite the solid imaging device.

18. (Previously Presented) The optical DNA sensor as claimed in claim 4, wherein the semiconductor layer of the field effect transistor has light sensitivity, and wherein the field effect transistor also has a bottom gate electrode and a light-transmissive top gate electrode.

19. (Previously Presented) The optical DNA sensor as claimed in claim 18, wherein a negative voltage is applied to the light-transmissive top gate electrode.

20. (Previously Presented) The optical DNA sensor as claimed in claim 1, wherein one of a positive voltage and a ground potential is applied to the conductive layer.

21. (Previously Presented) The optical DNA sensor as claimed in claim 1, further comprising a protective insulated layer between the conductive layer and the plurality of photoelectric elements.

22. (New) The optical DNA sensor as claimed in claim 1, wherein the exciting light absorbing layer includes titanium oxide.

23. (New) The optical DNA sensor as claimed in claim 22, wherein the exciting light absorbing layer is classified into one of anatase-type and rutile-type.

24. (New) The optical DNA sensor as claimed in claim 1, wherein, in the exciting light absorbing layer, transmissivity of light having a wavelength of 308 nm is 1.0×10^{-3} times or less than transmissivity of light having a wavelength of 520 nm.

25. (New) The optical DNA sensor as claimed in claim 1, wherein a thickness of the exciting light absorbing layer is at least 100 nm.